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Australian Council for Educational Research

international update

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Inside...

Beginning teacher standards in Saudi Arabia	2
National assessment reports on health of UAE school system	3
AHELO moves ahead	4
ACER and CBSE conduct international assessment conference	6
ACER India expands operations	7
Measuring adult skills in New Zealand	8
ACER and UNESCO Beirut collaborate in Arab States	10
Reading literacy reform in Portugal	11
Assessing generic skills	12
Testing basic mathematics in Norway	14
Australian Council for Educational Research (ACER)	16

Foreword

ACER continues to expand its range of international work. This edition of *International Update* covers projects in India, Saudi Arabia, New Zealand, the Arab States, Portugal and Norway – and that's just a sample of what we've been up to.

ACER greatly values our international organisational friendships, and we have worked this year with the Central Board of Secondary Education in India, and UNESCO Beirut. ACER has Memoranda of Understanding with both organisations, which have already paved the way to cooperation in educational development and research. Most recently, ACER has worked with UNESCO Beirut to begin the development of an education framework for the Arab States. ACER sees great value in regional initiatives of this kind, and is looking forward to providing continued support to this important work.

Elsewhere in the Arab States, ACER has also completed the first cycle of the United Arab Emirates National Assessment Program, which has provided valuable information about the health of the school system there, and has begun work on teaching standards in Saudi Arabia.

In January this year, ACER and CBSE jointly conducted the International Education Conference, which looked at school-based assessment. Speakers

came from India and all over the world, and included ACER's CEO, Geoff Masters, who spoke about cutting-edge research on learning from a neurological perspective. Over 1200 delegates attended the conference. The ACER India office has continued to expand, adding more staff and working on projects in India and the region.

In the higher education arena, ACER has begun to implement the international Assessment of Higher Education Learning Outcomes (AHELO) study. This will enable participating universities to compare the performance of their students with others around the world, and potentially facilitate international student mobility.

This issue also includes articles about measuring adult skills in New Zealand, reading literacy reform in Portugal, and testing mathematics in Norway, and once again demonstrates the breadth of ACER's international linkages and education work.

Please contact us if you'd like to know more about any of the projects mentioned inside, or about ACER's international work more generally.

We hope you enjoy reading this issue of *International Update*.

Peter McGuckian

Director of International Development, ACER

ACER receives many visiting groups from educational organisations around the world. Left: A delegation from the Henan University of China pose with ACER research staff in Head Office.

Beginning teacher standards in Saudi Arabia



Dr. Faisal Mashary Al-Saud, Dr. Lawrence Ingvarson and Dr. Abdullah AlSadaawi.

Once established, the standards will be used to develop a framework to guide teaching and learning policies and a framework for teacher professional development. It is also envisaged that in-service teachers will eventually be assessed against professional standards.

The beginning teacher standards framework forms part of a larger project known as the King Abdullah bin Abdul Aziz Public Education Development Project (Tatweer). Tatweer aims to improve educational outcomes in Saudi Arabia by improving the inputs. Teachers are one such input. Tatweer seeks to reduce the enrolment of individuals who lack the educational competencies required in the teaching profession.

Under Tatweer, NCAHE is responsible for a Teacher Professional Standards and Assessment Tools Project. This project has four major components. The first component – developing the standards – will be developed every five years with the aim of modifying standards according to trends in educational research and practice. The remaining three components – developing tools, data management, and reporting – will be conducted annually.

Together, these four components represent significant educational reform in Saudi Arabia. By developing teacher professional standards and assessment tools, NCAHE will establish benchmarks for teaching quality, identify training needs for beginning teachers, evaluate outcomes of teacher preparation programs, support education reform that aims to enhance teaching and learning, and establish national indicators in relation to teacher professional development.

Prospective teachers in The Kingdom of Saudi Arabia will soon have to demonstrate they meet benchmarks of teacher quality.

The Australian Council for Educational Research (ACER) is assisting the Saudi Arabian National Centre for Assessment in Higher Education (NCAHE) with the development of a framework for beginning teacher standards.

ACER Principal Research Fellow Dr Lawrence Ingvarson is chairing an International Advisory Committee responsible for assisting in developing a model for teacher professional standards in Saudi Arabia. The committee counts ACER Principal Research Fellow Dr Glenn Rowley, ACER Senior Research Fellow Dr Elizabeth Kleinhenz and prominent US education consultant Ms Charlotte Danielson among its members.

The beginning teacher professional standards will describe the skills, knowledge and values necessary for effective teaching. The standards will be used to design assessment tools for the purposes of selection among teaching candidates and will determine

training needs for accredited beginning teachers.

Prospective teaching candidates will have to show they can meet basic educational standards including knowledge of educational policies and rules in Saudi Arabia, pedagogy, assessment, child development and classroom management. They will also have to meet standards of basic Arabic language rules in reading, writing and grammar, standards of numeracy skills and standards of subject-specific content.

The first draft of the standards has been completed. It was introduced to the reviewing committees in October 2011 through a symposium of educators, experts and practitioners, and was published online for public review and comment. The symposium was also invited discussion about standards and their use within wider educational reform, including improving career paths for teachers, clearer long-term goals for professional development of teachers and accreditation. The outcomes of the symposium and public comments are being used to prepare a final draft of the standards framework, due for completion late 2011.

National assessment reports on health of UAE school system

Results from the 2010 United Arab Emirates National Assessment Program (UAENAP) show that, on average, UAE students are performing well in the areas of Reading, Mathematics and Science but need to do better in Writing and Spelling.

More than 40 000 students from 285 schools participated in the November 2010 assessment, which assessed all students in Grades 3, 5, 7 and 9 in the Emirates of Ajman, Dubai, Fujairah, Ras al Khaimeh, Sharjah, and Umm Al Quwain.

The results indicate that on average students in Grades 3, 5, 7 and 9 are performing well relative to the expected curriculum outcomes in Arabic and English Reading, Mathematics and Science. There is considerable variation in the results with some students performing exceptionally well. On average the mean performance of girls is better than the mean performance of boys, but boys are well represented in the top performing students.

The study shows that there is room for improvement in the areas of Writing and Spelling, both in Arabic and English and especially for boys. Alan Egbert, Manager of ACER's Dubai office, said that these findings are cause for concern and need to be addressed.

"These results highlight some long-term and short-term recommendations that need to be implemented, including modifying the curriculum and focusing more on writing activities in schools," said Egbert.

UAENAP aims to investigate the progress of students against the standards-defined national curriculum and to gather data to inform decisions about the allocation of resources,

curriculum development and teacher development to improve the learning outcomes of UAE students.

The study is conducted by the UAE Ministry of Education with assistance from the Australian Council for Educational Research (ACER). Minister for Education, Humaid Mohammad Obaid Al Qutami, first commissioned the study in order to monitor the current health of the UAE education system and provide evidence about how the system is performing in meeting the goals of the 'Education 2020' policy introduced in 2007.

Under UAENAP, a range of reports are provided to all levels of the educational community. At the highest level, the Minister and the ministry receive an overview of the performance of students across all the participating Emirates and information about the strengths and weaknesses in their current learning. This information can be used to inform policy and curriculum development for the nation.

At each level of the education system there are reports to assist educators in improving student learning, with reports to Zone Directors, the principal of every school and each classroom teacher about the performance of students in their care.

Parents also receive a report that shows their child's results in each subject, both in terms of their success in individual skills and overall as an indication of their standard in the subject. The standards statements also indicate to parents the types of skills that students need to acquire in order to improve their learning outcomes.

"The tests not only show the children how they have fared but also provide the actual expectations," said Egbert. "This will help tremendously in their personal goal setting for improvement."

Following this successful first implementation of UAENAP, the survey will next be conducted in January 2012 and will continue annually.



AHELO moves ahead

Content and assessment experts from 14 countries around the world have made significant progress towards investigating the feasibility of an international Assessment of Higher Education Learning Outcomes (AHELO).

The AHELO Feasibility Study is determining whether it is possible to measure at the international level what undergraduate degree students know and can do. The assessment aims to provide better information than is currently available to higher education institutions, governments, and other stakeholders including students and employers.

ACER is leading a consortium of international organisations in the design and implementation of the feasibility study on behalf of the Organisation for Economic Cooperation and Development (OECD).

Chair of the AHELO Feasibility Study Technical Advisory Group and Vice President at the USA National Centre for Higher Education Management Systems (NCHEMS), Dr Peter Ewell, believes AHELO is significant because it is the first time anyone has tried to compare tertiary outcomes internationally.

"If institutions see a similar institution achieving better outcomes they want to know 'what are we doing differently and how can we do things like them?'," said Dr Ewell. "Through AHELO we can start finding out what works."

The AHELO Feasibility Study focuses on Economics, Engineering and Generic Skills. Progress is occurring at a rapid pace in each of the modules, with enormous interest and goodwill among both academic experts and countries, including those who are not directly participating.

In early 2011 the test instruments were translated into the languages of participating countries and shown to focus groups. The feedback gained from students and faculty from a range of institutions in participating countries will be used to refine and improve the instruments.

The Educational Testing Service (ETS) in Princeton New Jersey has developed an Economics instrument which tests the skills and knowledge of final-year bachelor degree students. The framework and items undergo adaptation, translation and validation in 2011.

AHELO's Economics Expert Group is chaired by Cecilia A. Conrad, Vice President and Dean of Pomona College in California, where she is also the Stedman-Sumner Professor of Economics.

Professor Conrad said she is happy that the Economics Expert Group was able to work out what questions would work across borders.

"With AHELO, we can learn what students need to gain a better understanding about so they will be able to compete with and work with graduates from other institutions around the world," said Professor Conrad.

ACER has been working with colleagues from Japan's National Institute for Educational Policy Research and the University of Florence to develop a framework and test for the field of Engineering.

AHELO's Engineering Expert Group has reviewed 12 draft test units; each developed around a key engineering problem with a range of multiple choice and written response items. The best four items were selected and revised. The Expert Group also analysed a

large set of items from the licensing exam for civil engineers in Japan and selected those most suitable to include in AHELO's engineering test.

ACER worked with partner organisations to refine and validate the items in preparation for adaptation, translation and validation in 2011.

The AHELO Feasibility Study Engineering Expert Group is chaired by Robin King, Emeritus Professor of Engineering at the University of Technology, Sydney, and Executive Officer of the Australian Council of Engineering Deans.

In developing instruments for the assessment test in Civil Engineering, Professor King stresses the need for instruments that can measure both technical knowledge and how graduating civil engineers look at problems.

"We need to measure their technical capability to solve them and their understanding of the broader impacts of civil engineering in society, such as the social and environmental impacts of locating a dam," said Professor King.

Despite the challenge of developing instruments which acknowledge the differing philosophies of engineering education around the world, and the need to ensure that all questions are appropriate to students in all countries, Professor King is optimistic about the potential for the AHELO Feasibility Study.

"Measuring the outcomes of education is very difficult but it's really important," said Professor King.



ACER and CBSE conduct international assessment conference



India conference 2011



ACER collaborated with the Indian Central Board of Secondary Education (CBSE) to conduct an international conference on 'Development in Assessment: Scope of Assessment in Teaching and Learning' in Delhi earlier in January. Mr Kapil Sibal, Union Minister Human Resource Development and Communication and Information Technology, Government of India inaugurated the conference.

From 24–25 January around 1000 delegates from India, UAE and neighbouring countries came together to hear from a range of speakers who are internationally renowned in the field of educational assessment.

ACER chief executive Professor Geoff Masters delivered the opening keynote presentation of the conference. Masters' presentation focused on assessment for improved teaching and learning.

"The fundamental purpose of assessments for improved teaching and learning is to establish where individual students are up to in their learning, thereby assisting teachers to identify starting points for teaching," said Masters.

"Assessments for improved teaching and learning provide a way of monitoring individual progress over

time," said Masters. "By assisting students to see their progress, these assessments build self-confidence."

On the second day of the conference, ACER Principal Research Fellow Professor Gabrielle Matters gave a presentation on the use of statistical moderation to scale school-based assessments to public examination results.

"The increased emphasis on teacher judgment in high-stakes assessment has increased the importance of the role of moderation in ensuring that student performances of equivalent standard are recognised as such," said Matters.

Conference presentation slides and summaries for nine of the 18 conference speakers are available from the ACER website.

The conference addressed issues related to student assessment and student learning including developmental assessments and what can be learned from research; understanding best practice in assessment; using assessment to monitor teacher effectiveness and encourage school improvement; developing support systems for using assessments in the classroom; and policy changes in the new educational framework for improved assessments.

Manager of ACER India, Ms Ratna Dhamija, explained the conference was undertaken as part of CBSE's agenda to strengthen school-based assessment and implement continuous and comprehensive evaluation in schools at the primary, middle and secondary level.

"CBSE is in the midst of reforms, particularly in the areas of assessment," Ms Dhamija said.

"The Board has, through its various interventions, brought about many initiatives in the area of curriculum, pedagogy and assessment. Its endeavour is to enable learning around the different aspects of assessment and proven best practices."

Ms Dhamija said the conference had been very successful. Initial feedback from delegates has been positive and further feedback is being collected.

Organisers hope the conference will become a yearly event.

The conference follows the signing of a Memorandum of Understanding between CBSE and ACER in Melbourne in April 2010 to collaborate on programs and initiatives that apply international best practices in educational research and assessment to support educational development.

ACER India expands operations

ACER India has increased the size of its workforce and now comprises double the number of staff employed last year.

In January 2011 six new staff joined the ACER India team that is headed by Manager Ratna Dhamija, with Dr Umesh Kumar continuing in his role as Research Officer.

"The new staff have significantly added to the capacity of ACER India," said Manager of ACER India, Ratna Dhamija.

Rudra Sahoo joins ACER India as a Research Fellow, having worked for India's National Council for Educational Research and Training. Sahoo and new Research Fellow Dr Rajat Chadha will focus their work as data analysts on international achievement studies, state monitoring programs and on evaluation studies.

New Research Officers Shalini Chandra and Dr Abha Bhagat are working as test developers for the assessment projects undertaken by ACER India, which include projects for development agencies in South Asia region, and for Indian state and federal agencies.

Amitav Dutta joins ACER India as the office's first Editor. His role will be to lead and manage the commissioning, development, editorial, production, marketing, sales and distribution of resources and assessments for use in the Indian education system. New Marketing Officer Anuradha Prem will assist in promoting these resources as they become available.

The expansion of ACER India means there is increased capacity in this organisation to enable it to independently undertake educational research and development work in India and surrounding countries.

ACER India has made significant progress from its origins in 2003, when initial work involved the marketing of tests through agency arrangements to private schools teaching English. When it became clear that a formal status and presence was required, ACER employed staff in India in late 2004.

To further facilitate ACER's international work, ACER Liaison Office status was approved for the India office in January 2005. The ACER Liaison Office in India gained its first permanent staff member, Ratna Dhamija, in August 2005 and three more permanent staff were appointed the following year.

In 2007 ACER officially established its Indian subsidiary, the Australian Council for Educational Research (India) Pvt Ltd, in New Delhi. Three years later, in 2010, ACER India was approved as a not-for-profit organisation by the Indian Ministry of Corporate Affairs.

The change to not-for-profit status means that all funds raised by ACER India will remain in India to be used for the development of Indian education systems and to the benefit of the country.

The change also firmly establishes ACER's standing as a non-government organisation (NGO) in the Indian context, and further indicates ACER's commitment to supporting educational development programs in India and the South Asia region.



Measuring adult skills in New Zealand

An adaptive assessment of reading, writing and mathematics is helping improve adult literacy and numeracy in New Zealand.

The *Literacy and Numeracy for Adults Assessment Tool* gives information to providers of training and workplace programs and tertiary education organisations that can both help to shape the development of learning interventions that match learners' needs, and allow learners to track their progress over time.

The assessments of numeracy, reading and writing are tailored specifically to New Zealand adult learners and are designed to reflect the New Zealand Learning Progressions.

The Assessment Tool is an adaptive assessment: the questions presented to the learner are selected on the basis of the learner's performance on previous questions in the assessment. It is administered on-line, allowing the customised selection for each learner of about 30 questions from a library of over a thousand each of numeracy and reading questions.

The Assessment Tool was developed for the NZ Tertiary Education Commission by a consortium comprising the NZ Council for Educational Research (NZCER), the Australian Council for Educational Research (ACER) and IT provider Fronde Systems Group. ACER was responsible for the item development and psychometric components of the work.

ACER Research Director of Assessment and Reporting: Humanities

and Social Sciences, Juliette Mendelovits, said the assessment is designed to estimate what point along a continuum of development learners have reached in numeracy, reading or writing, and what consequently might be done to help them redress any gaps in their learning and progress to the next level.

As an assessment for adults, the questions are set in contexts or situations in which adults typically draw on literacy and numeracy skills and knowledge: work, home and family, health and safety, consumer economics, community and citizenship, leisure and recreation, and education and training.

The reading assessment includes a range of texts in different formats, in recognition of the fact that adults read both continuous text, such as in newspapers, magazines and books, and also non-continuous texts such as tables, graphs, maps and forms. Similarly, the numeracy assessment covers a variety of skill areas that adults may need to draw upon in their everyday

lives, such as number knowledge and strategies, and measurement.

Another feature afforded by the adaptive assessment's online



Photo by Yuri Arcurs, Shutterstock

administration is instant reporting. Upon completing the survey learners are immediately issued with an individual report that shows where they are on the scale and explains what they should be able to do. Learners who have completed more than one assessment also receive a progress report.

At the same time the educator can immediately access a more detailed report which shows the learner's results, describes

the features of the questions and highlights skill areas in need of focus. Group reports and institution-level reports are also available.

In addition to the online adaptive instruments, a pen and paper writing assessment can be downloaded to measure the learner's skills in areas such as communicating with an audience, whole text cohesion, spelling and grammar. The writing task is hand marked by the educator using a purpose-designed analytic scoring guide. Scores for each criterion are then entered into the online tool, and a suite of reports can be automatically generated, as for the reading and literacy assessments.

The Assessment Tool was launched in March 2010 and, since its launch, ACER has completed an enhancement project which involved adding 200 additional test items with a particular focus on assessing the skills of learners with lower proficiency.

The NZ government has been actively seeking to improve adult literacy and numeracy levels since results from the 2006 Adult Literacy and Life Skills (ALL) Survey revealed that a concerning number of people did not achieve the benchmark required to fully participate in today's adult life.

The survey, a joint project between the OECD,

the Government of Canada and the US National Center for Education Statistics, measured proficiency among 16-65 year-olds in four "domains": prose literacy (continuous texts), document literacy (non-continuous texts), numeracy and problem-solving.

ALL revealed that around 1.1 million New Zealanders (43 per cent of adults aged 16-65) had literacy and numeracy skills below the minimum considered necessary for full participation in the knowledge society and economy. Results for Australia and for English-speaking Canada were similar, while the USA fared slightly worse in each of the domains it was measured on.

It is hoped that initiatives such as the *NZ Literacy and Numeracy for Adults Assessment Tool* will help to increase adult literacy and numeracy levels worldwide. Later this year there will be an opportunity to measure whether any progress has been made, in Australia and 26 other countries, when the OECD Programme for International Assessment of Adult Competencies (PIAAC) is conducted.

PIAAC will assess proficiency among 16-65 year-olds in literacy, numeracy and problem-solving in a technology-rich environment. The international consortium that is managing the assessment on behalf of the OECD has commissioned ACER to develop all of the new literacy tasks for PIAAC, drawing on both original development and on contributions from participating countries. Results from PIAAC will be reported in 2013.



ACER and UNESCO Beirut collaborate in Arab States



(L to R) ACER Deputy Research Director Dr John Cresswell, ACER Director of International Development Peter McGuckian, UNESCO Regional Bureau for Education in Arab States Director Dr Abdel Moneim Osman, UNESCO Beirut Senior Programme Specialist Said Belkachla, and ACER Dubai Manager Alan Egbert.



Peter McGuckian and Dr Abdel Moneim Osman after signing the memorandum of understanding

ACER and UNESCO's Beirut regional office have signed a memorandum of understanding that creates opportunities for joint research and the development of a learning assessment to monitor educational quality in the Arab States.

The memorandum was signed by Peter McGuckian, ACER Director of International Development, and Abdel Moneim Osman, Director UNESCO Regional Bureau for Education in Arab States, at UNESCO's Beirut office in Lebanon on 3 November 2010.

"This memorandum signals the coming together of ACER and UNESCO Beirut to use the individual strengths of each organisation to achieve a mutual goal," said McGuckian.

The signing of the memorandum heralds joint endeavours to perform educational research in the Arab States, particularly related to UNESCO's Education for All program, to support educational policy development in the region and to organise and participate in jointly sponsored conferences, seminars and workshops.

Under the initiative, ACER and UNESCO Beirut will collaborate to develop a common regional learning assessment framework to be used as a benchmark for measuring educational quality in the Arab States.

Together ACER and UNESCO Beirut will assist in the development of educational assessment and evaluation programs for the Arab States and will facilitate training workshops to build national capacity for the programs' implementation.

The framework will outline the context and define terms for a common regional educational improvement initiative, will propose a management structure, identify appropriate measures, and will develop a model for calculating these measures and interpreting results.

ACER Deputy Research Director of International Surveys Dr John Cresswell is leading the development of the framework, following his preparation of a background note on the Arab States performance in learning assessment and the main challenges for enhancing evidence-based knowledge for policy makers to improve education quality.

"The Arab States are heavily engaged in national and international assessments but so far little work has been done on translating data into information, policy and practice," said Cresswell.

"The program will therefore focus on building capacity within the Arab States to analyse, interpret and make good use of existing assessment results, before embarking on more assessment."

In a presentation to the expert group overseeing the initiative, held in Beirut in December 2010, Cresswell described some of the ways that various countries are using international and national assessments and offered a number of different options for the regional initiative.

A draft framework for the initiative was submitted in March 2011, and was subject to review before being finalised in July then presented to the meeting of the Ministers of Education of the Arab states at the UNESCO General Conference side meetings in October 2011.

Reading literacy reform in Portugal

ACER has helped develop a book of classroom resources for Portuguese teachers of reading that is based on the OECD Programme for International Student Assessment (PISA).

Para uma Avaliação da Leitura na Língua Portuguesa (For an Assessment of Reading in Portuguese) contains reading stimulus texts, questions and scoring guides that familiarise teachers with PISA-style reading assessments and provide a resource that can be used in the classroom.

The book is published by the Gabinete de Avaliação Educacional (GAVE), the Portuguese Department of Educational Evaluation.

GAVE engaged a staff member from ACER, who have led the consortium responsible for each round of PISA to date, to consult on the book's development.

As a member of the team at ACER involved in the development of the PISA reading literacy assessment, ACER Senior Research Fellow Dr Tom Lumley was invited to give feedback on the units of work under consideration for inclusion in the book. He also wrote the introduction to the book, in which the PISA reading framework is described.

"It is an extremely innovative project," said Lumley. "No country has ever produced such a large selection of reading materials that are explicitly categorised according to the PISA framework."

The book contains 38 different units of work, chosen from a much larger number of potential units. The units were developed by teachers of reading from schools across Portugal following a series of workshops led by GAVE staff, which in turn drew on materials produced by Lumley and fellow ACER

researcher, Juliette Mendelovits, for a workshop on developing reading items according to the PISA framework, given in Mexico City in 2007.

Under the PISA framework, reading assessments focus on the use of written texts in daily life, rather than knowledge about language, grammatical features, understanding of vocabulary, and of cultural references embedded in texts.

"This resource is going to help teachers become familiar with the kinds of texts and the styles of questions used in PISA-style reading assessments, which are somewhat different from the forms of assessment previously used in the Portuguese education system," said Lumley.

The book was launched by Portuguese Minister for Education Isabel Alçada and the Director of GAVE, Dr Helder Diniz de Sousa, at a conference on the assessment of reading and writing in Portuguese, held in Lisbon in September last year. Lumley delivered the conference's major presentation, titled 'Reading literacy in the 21st Century: Lessons from PISA'.

"PISA has shown itself to be a good predictor of attendance at university, as well as a range of kinds of economic success," said Lumley. "Improving the ability of Portuguese students to cope with the kinds of reading tasks that are represented in PISA is a worthwhile exercise."



Assessing generic skills



Results from the pilot implementation of the Cognitive Skills Test at Imam Muhammad bin Saud Islamic University (Imam University) are informing groundbreaking Saudi Arabian educational practice.

The test of reasoning and problem solving skills is a collaboration between Imam University and ACER, designed to gain better understanding of the growth in generic skills attained by students over the course of their undergraduate studies.

ACER's General Manager of Higher Education Assessment Services, Marita MacMahon Ball, said the test administration was the first of its kind at Imam University, perhaps even in Saudi Arabia.

"The pilot implementation was a groundbreaking institutional research and quality activity," said MacMahon Ball.

Information gathered by the test will help Imam University provide students with the education and training they need and will support University monitoring and continuous improvement initiatives.

The test items and structure are based on the Graduate Skills Assessment, a similar assessment developed by ACER that is used by Australia's higher education sector. Multiple-choice items assess students' skills in two domains – Problem Solving and Critical Thinking.

In October 2010 a sample of around 2 200 students from Imam University's faculties of Humanities, Science and Islamic studies were selected to sit the test, drawn from new students, students in year three and students in their final year.

Results showed there was variation in student outcomes, especially in terms of the faculty and fields in which they were studying, and their year level.

In general, males and females performed similarly. Students from the Sciences faculty recorded higher performance on both the Problem Solving and Critical Thinking components of the assessment than did students from the Humanities or Islamic studies faculties. Within the Science faculty, Medicine students recorded the highest outcomes.

Encouragingly, the average scores for each test component increased the longer a student had been enrolled at the university. This was apparent for all faculties. However, the difference in outcomes between first- and second-year students were statistically significant, while the differences from third- to fifth-years were not.

The main purpose of the pilot was to examine the measurement properties of the test rather than yield performance data on students. Student scores were well spread, forming roughly normal distributions like those characteristic of valid and reliable assessments.

"In a pilot program it is a relatively normal outcome to find that certain types of items, items of particular contexts and issues of translation are problematic," said MacMahon Ball.

"A valuable exercise that came of this pilot was a thorough review of those items that have performed well and a diagnostic review of those that have under-performed to inform the item development phase of the 2011 program."

The 2011 test incorporates significantly more material developed locally at Imam University, to make the

content more appropriate and relevant to the student population. Easier items are included in the test along with items that tap into more conventional content-focussed forms of performance. More discipline-focused items have been developed in order to yield faculty-specific performance information.

As part of the development of the Imam University Centre for Evaluation and Assessment (ICEA), ACER worked with Imam University to develop appropriately targeted test items for the 2011 Cognitive Skills Test.



Testing basic mathematics in Norway



The Norwegian government is investing in training and assessment initiatives designed to improve student numeracy levels.

In April a group of delegates from the Norwegian Centre for Mathematics Education (NSMO) travelled to ACER's Melbourne office to participate in a series of customised training workshops on computer-based testing. Over four days, ACER and NSMO engaged in conversations on the topics of the rationale for the use of interactive digital test items in large scale assessment, the challenges of developing test items for an interactive digital medium, the decisions and practices that ACER has adopted in the development of interactive digital test items in large scale assessments and the topic of education systems and practices in Australia and Norway.

The purpose of the study visit was to increase NSMO's capacity to develop interactive test items for the computer-based National Test in Basic Skills in Mathematics. Introduced in 2004 and computerised in 2009, the test is designed to assess student's ability to use basic mathematical skills such as number, measuring and statistics in different contexts.

"It is not a test of mathematics curriculum, rather it is a test of mathematical competence in all school subjects, including Society and Environment, Physical Education and Science," said NSMO's Grethe Ravlo.

Norway's National Test is conducted in Years 5 and 8, or with 10 year-old and 13 year-old students respectively. Around 60 000 students at each year level take the annual computer-based National Test in Basic Skills in

Mathematics, as well as the National Test in Norwegian Reading and the National Test in English.

In Norway, Ravlo leads a team of nine educators who develop the National Test in Basic Skills in Mathematics. In addition to working at NSMO developing the National Test, these nine educators are also working part-time as teachers, teaching in classes ranging from Year 5 through to university level.

"We have teachers developing items for the national assessment," said Ravlo. "This is very important."

Over the last decade, Norway's assessment results have shown mathematics to be an area of concern. In 2010 students from Year 9 were also asked to take the Year 8 National Test in Basic Skills in Mathematics. Results revealed the Year 9 students performed only slightly better than Year 8 students.

Measuring and fractions are problem areas for many Norwegian students. Statistics, on the other hand, is an area that their students tend to perform well in, as can be seen in Norway's PISA results.

Results from the first administration of PISA in 2000 revealed that Norwegian students were performing at around the OECD average. The 2003 PISA administration showed a slight decline and in 2006 Norway performed significantly below the OECD average. Results from PISA 2009 show that the downward trend has been reversed, as Norway's students are very close to level they were in 2000 and are now performing at around the OECD average. However, Ravlo and her

colleagues at NSMO think Norway can and should do better.

"There is not always a connection between what we want our children know and what they actually know," said Ravlo. "They have much more to learn."

Ravlo explained that some Norwegian parents are not good at mathematics and so they do not expect their children to be good at mathematics.

"We can't accept that," said Ravlo. "We have courses for parents in Norway, called 'Family Maths', where they sit together with the children doing activities and playing games. In this way we can encourage the parents to give their children inspiration and enthusiasm in learning mathematics."

NSMO also provides training courses for classroom teachers, commissioned by the Ministry of Education, to coordinate and develop new and better ways to teach mathematics at all levels in school, by connecting teaching theory and practice. The Ministry of Education's framework for national tests underpins the computer-based National Test in Basic Skills in Mathematics that NSMO is developing.



Australian Council for Educational Research (ACER)

The Australian Council for Educational Research (ACER) is one of the world's leading educational research centres. Its mission is to create and promote research-based knowledge, products and services to improve learning across the lifespan.

ACER was established in 1930 and for more than 80 years has built a strong reputation as a provider of reliable support and expertise to education policy makers and professional practitioners. As a not-for-profit organisation, independent of government, ACER receives no direct financial support and generates its entire income through contracted research and development projects and through products and services that it develops and distributes. ACER has experienced significant growth in recent years and now has more than 300 staff located in Melbourne, Sydney, Brisbane, Perth, Adelaide, Dubai and New Delhi.

ACER works in an increasingly international context providing support through consultancies and professional development programs to several countries establishing national assessment programs, undertaking commissioned research and providing assessment services to a broad range of international clients.

International studies

ACER leads a consortium of research organisations that manages the Organisation for Economic Cooperation and Development Programme for International Student Assessment (PISA) project to assess the mathematical, scientific and reading literacy skills of 15-year-olds in more than 60 countries. ACER has also been responsible for the Australian component of studies conducted by

the International Association for the Evaluation of Educational Achievement (IEA), including the Trends in International Mathematics and Science Study (TIMSS) and the International Civic and Citizenship Education Study (ICCS).

International assessment services

A number of ACER's assessment services have been adapted or specially developed for international clients. The International Schools Assessment (ISA) was developed by ACER researchers to measure the reading, mathematical literacy and writing (narrative and exposition) achievement of students in Years 3 to 10 in international schools worldwide. The International Benchmark Tests provide pencil and paper tests for students in Years 3 to 10. The tests measure student performance in the generic skills that underpin the teaching of English, mathematics and science. The program is administered by schools in India and the Middle East. A number of universities in the United Kingdom and Ireland now use ACER-designed tests for entry into medical schools, and mature-age university admissions.

Development projects

ACER has extensive experience in providing professional development programs for ministries of education and institutions throughout the world and through agencies such as Australia's overseas aid program (AusAID) and the World Bank. ACER has undertaken a broad range of consultancy work to support aid-funded projects. Recent examples include:

- a significant number of projects under the AusAID-funded

Australian-Indonesia Basic Education Program: Contractor Strategic Advisory Services, including evaluation of the impact of teacher certification policy, research into the national examinations and item development training;

- a report for the Secretariat of the Association of Southeast Asian Nations (ASEAN) on behalf of the East Asia Summit, which outlines strategies for promoting regional economic competitiveness and community building through cooperation in education across the 16 member countries.
- work for the Ministry for Public Education in Mexico to develop a test for students in two secondary school levels, incorporating PISA items, that will allow them to compare their students' achievement with data gathered from PISA and provide a progress monitoring tool.
- work for the World Bank and the Ministry of Education in Tajikistan to design and set-up a new National Testing Centre, which will be responsible for all national assessments in the country.

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